Keeping the appeal in clean-label drinking yoghurt

Pure dairy opportunities with Nutrilac® whey proteins

Abstract

Consumers are increasingly concerned about additives in their food. According to Mintel, 35% of EU consumers regularly check ingredient lists on food packaging, and the same number avoid products made with artificial additives and preservatives. This is driving today's trend towards clean-label foods.

In the fresh dairy category, the clean-label trend represents a challenge for drinking yoghurt manufacturers. Many rely on stabilisers such as pectin to give the yoghurt a smooth and refreshing quality during shelf life. Consumer demand for high-protein products has increased the reliance on solutions that can maintain a stable, appealing texture with low viscosity.

This paper documents the opportunities to use Nutrilac® whey proteins as a clean-label, pure dairy solution in drinking yoghurt with 2-10% protein.

Arla Foods Ingredients
Discovering the wonders of whey

The technical challenges

An appealing drinking yoghurt should be smooth and creamy and have a low viscosity that makes it pleasant to drink. Conventional stabilisers are widely used in low-protein drinking yoghurt to prevent common defects: syneresis, poor viscosity and dry texture. In high-protein drinking yoghurt, the challenge is to keep a low viscosity and smooth texture when the protein content is increased.

Low-protein drinking yoghurt

- Phase separation
  During drinking yoghurt production, acidification of the milk causes the casein proteins to denature and join together in aggregates. When these aggregates reach a certain size, the network can no longer hold them, and the aggregates start to sediment. This results in phase separation, where syneresis is recognised as a watery layer of whey on the yoghurt surface.

Figure 1: Syneresis caused by phase separation during shelf life

High-protein drinking yoghurt

- Poor viscosity control
  It goes without saying that a drinking yoghurt must be pleasant to drink. However, due to their low heat stability, whey proteins denature during pasteurisation. This causes viscosity to increase, compromising flow properties. Viscosity is also influenced by protein gel formation, which occurs when pH is reduced during fermentation of standard milk and/or milk proteins.

Figure 2: Protein denaturation during pasteurisation causes viscosity to increase

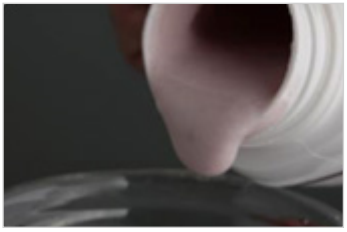

Figure 3: Fermentation reduces pH and causes a protein network to form making the product more viscous

- Dry, grainy texture
  The higher the protein content of drinking yoghurt, the higher the risk of a dry mouthfeel and coarse, sandy texture, resulting from milk protein precipitation.

Figure 4: Protein addition can result in a visibly sandy texture

A pure dairy alternative to conventional stabilisers

Nutrilac® whey proteins have natural water-binding and gelling properties that make them a useful, clean-label alternative to commercial stabilisers when tailoring the texture of drinking yoghurt.

Tests at the Arla Foods Ingredients application centre in Denmark have documented how Nutrilac® performs in drinking yoghurts that are low or high in protein.

Performance in low-protein drinking yoghurt

Trials compared Nutrilac® whey proteins with a standard commercial pectin used as a stabiliser in low-protein drinking yoghurt.

- Stability during storage
  Three drinking yoghurt samples were produced, each with 1.8% protein. Two of the samples contained either pectin or Nutrilac®, while the third was the control, made only with fermented milk. Over three weeks of storage, syneresis was measured on a VideometerLiq, a multispectral stability tester. The results show that pectin and Nutrilac® provide excellent syneresis control (see figure 5). Syneresis is even slightly lower when Nutrilac® is used.

- Viscosity perception
  Viscosity was measured in 1.8% protein drinking yoghurt containing either pectin or Nutrilac®. The results show that use of Nutrilac® results in the same viscosity perception as pectin during shelf life (figure 6).

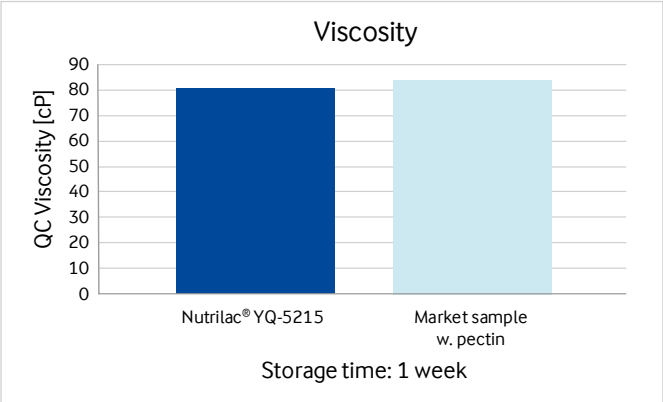

Figure 6: Viscosity evaluation of drinking yoghurt - low-protein

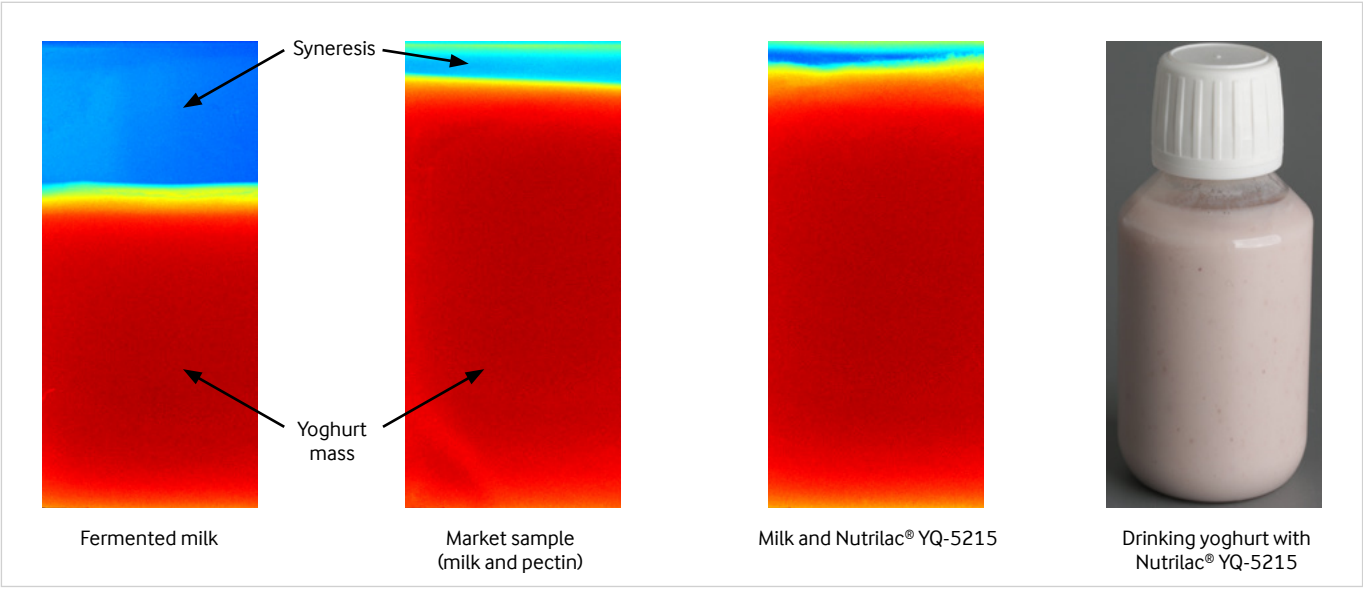

Figure 5: Syneresis development in a low-protein drinking yoghurt after three weeks

- Sensory evaluation
  In a sensory evaluation of 1.8% protein drinking yoghurt with pectin or Nutrilac®, both received a high smoothness score and a low score for dryness and mouthfeel. Good performance on these parameters is key to consumer appeal.

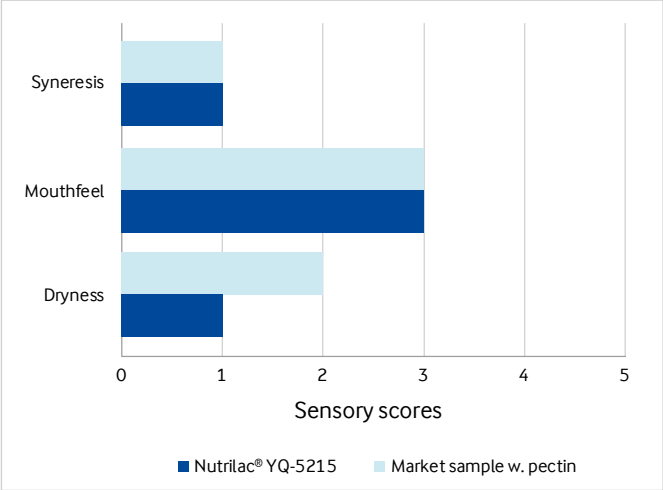

Figure 7: Sensory evaluation of drinking yoghurt - low-protein

Performance in high-protein drinking yoghurt

A commercial drinking yoghurt containing 6.7% protein from concentrated milk was compared with a drinking yoghurt containing 9.5% Nutrilac® whey protein. Both yoghurts contain a fruit preparation, which presents an extra challenge when increasing the protein content.

- Viscosity control
  The results in figure 8 show the viscosity is considerably lower in the test yoghurt with Nutrilac®, even though the protein content is almost 50% higher. This demonstrates a good opportunity to produce high-protein drinking yoghurt with a pleasant, low viscosity – also when the recipe includes 10% fruit preparation.

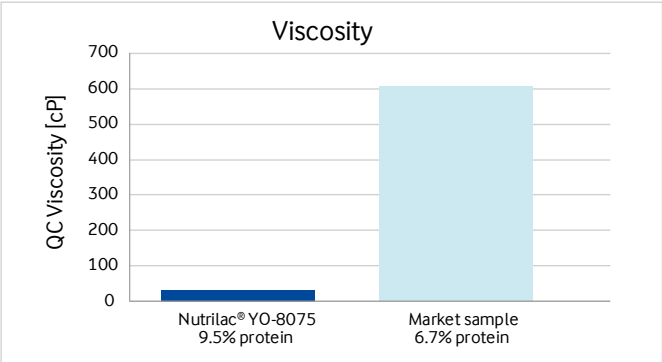

Figure 8: Viscosity control of drinking yoghurt - high-protein

- Sensory evaluation
  The commercial product with 6.7% protein scores highest for dryness and mouthfeel in a sensory evaluation, indicating high viscosity with lower appeal. The drinking yoghurt with 9.5% Nutrilac® whey protein is clearly the better performer.

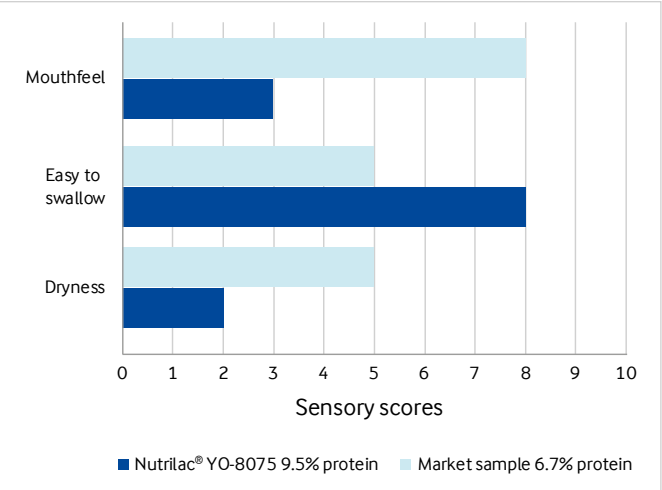

Figure 9: Sensory evaluation of drinking yoghurt - high protein

Summary

Results from our trials show that Nutrilac® whey proteins are a highly suitable, clean-label solution for standard drinking yoghurt. Regardless of the protein content, syneresis is minimal, viscosity remains low and the texture is smooth without dryness. Nutrilac® is a pure dairy ingredient – and a natural choice for the dairy industry.

Don't hesitate. Get in touch

Interested in learning more about how you can use Nutrilac® as a clean-label solution for your drinking yoghurt brands? Just send us a mail at dairy@arlafoods.com, and we'll get back to you as soon as possible.

ASK US FOR: samples, recipes, application support

Contact us at dairy@arlafoods.com

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